

AD-A149 790

SUGAR CREEK BASIN NORTH CAROLINA & SOUTH CAROLINA FLOOD
CONTROL ALTERNATI. (U) CORPS OF ENGINEERS CHARLESTON SC
CHARLESTON DISTRICT 19 APR 79

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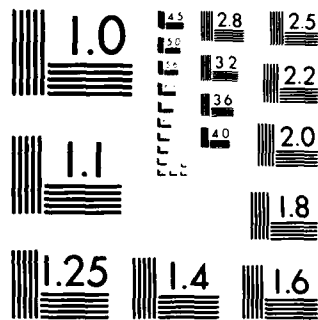
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SUGAR CREEK BASIN

NORTH CAROLINA & SOUTH CAROLINA

AREA II

DERITA BRANCH
KINGS CREEK
LITTLE HOPE CREEK
LITTLE HOPE TRIBUTARY
LITTLE SUGAR CREEK
STEWART CREEK
STEWART TRIBUTARYS I & II
SUGAR-IRWIN CREEKS
TAGGART CREEK
PINEVILLE, N.C.

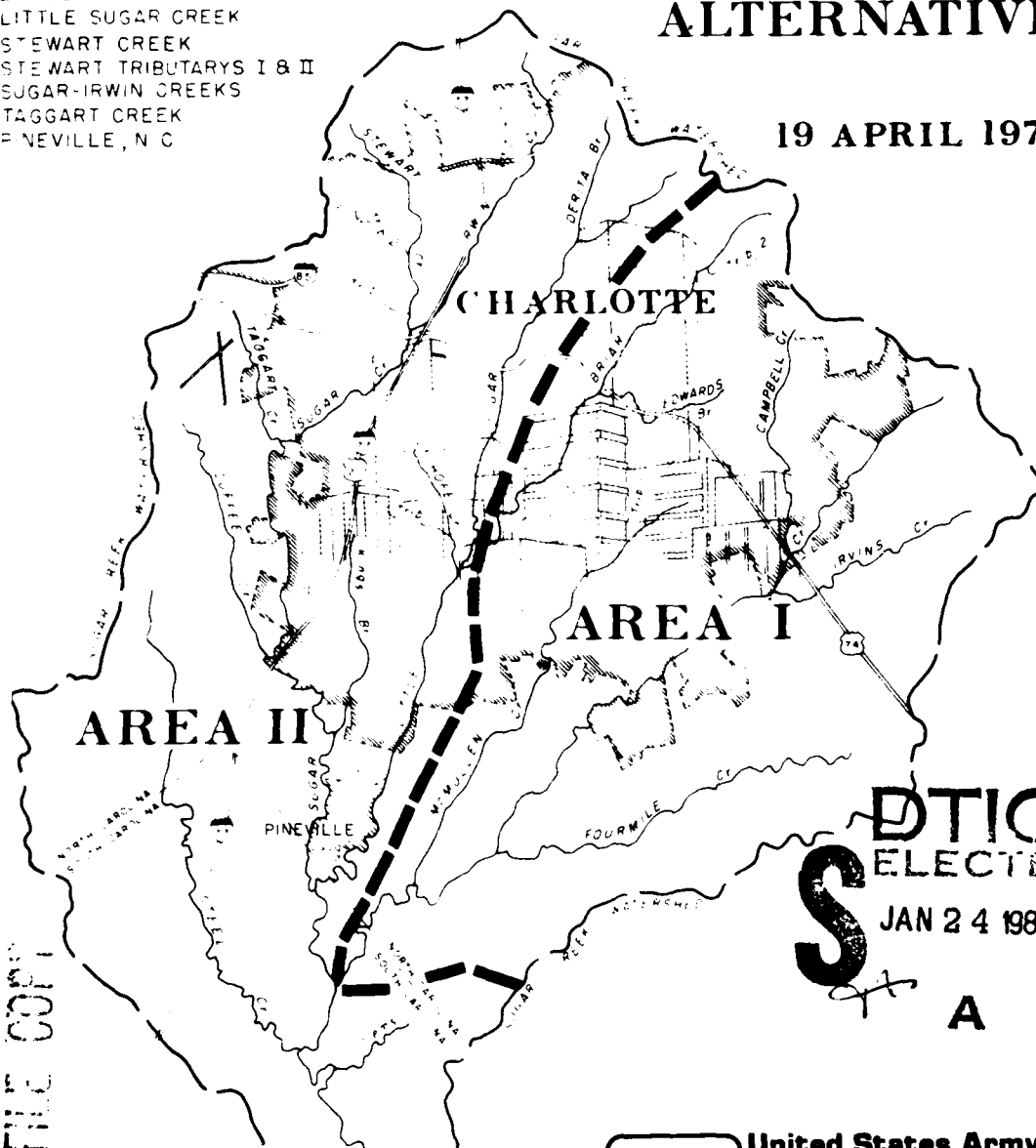
FLOOD

CONTROL

ALTERNATIVES

19 APRIL 1979

AD-A149 790



AREA II

AREA I

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United States Army
Corps of Engineers

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Charleston District

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PLAN FORMULATION PUBLIC MEETING

SUGAR CREEK BASIN
FLOOD CONTROL ALTERNATIVES
AREA II

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SUGAR CREEK BASIN
FLOOD CONTROL ALTERNATIVES
AREA II

INTRODUCTION

This brochure presents information on alternative plans which have been formulated as potential solutions for the reduction of flood damages experienced in the western half of Sugar Creek Basin, North Carolina and South Carolina. Alternative solutions for the following streams are discussed in this brochure:

- *DERITA BRANCH
- *KINGS CREEK
- *LITTLE HOPE CREEK
- *LITTLE HOPE TRIBUTARY
- *LITTLE SUGAR CREEK
- *STEWART CREEK
- *STEWART TRIBUTARIES 1 & 2
- *SUGAR-IRWIN CREEKS
- *TAGGERT CREEK

Potential flood control alternatives for the Town of Pineville, North Carolina are also presented in this brochure.

Alternative plans for the remaining portion of Sugar Creek Basin are presented in a similar brochure which will be made available upon request. These plans were presented and discussed at the plan formulation public meeting held on 18 April 1979 in the Charlotte Civic Center. Alternative solutions for the following streams were presented and discussed at the 18 April 1979 public meeting.

- *BRIAR CREEK
- *BRIAR TRIBUTARY #2
- *CAMPBELL CREEK
- *EDWARDS BRANCH
- *MCALPINE CREEK
- *MCMULLEN CREEK
- *MCMULLEN TRIBUTARY

This brochure is intended to help you understand the flood problems of the Sugar Creek Basin and to present potential alternatives to alleviate flood damages. You are encouraged to make full use of this brochure to assess potential effects of the flood control alternatives and the desirability of implementing the various alternatives. Everyone will be given the opportunity to participate by expressing views and furnishing data on any aspect of the study. You are encouraged to freely, fully and publicly express your views by:

. Writing to:

District Engineer
U. S. Army Corps of Engineers - Charleston
P. O. Box 919
Charleston, S. C. 29402

. Calling:

Corps representatives will be available locally at the Cameron-Brown Building (Phone 374-2291) from 8:00 a.m. - 4:00 p.m. on Thursday, 19 April (Area I) and 8:00 a.m. - 11:30 a.m. on Friday, 20 April, (Area II). Calls may also be made to the Corps office in Charleston, S. C., after the 23rd of April (Area Code 803-724-4247 or 724-4254).

. Participation in:

Plan Formulation Public Meetings
18 & 19 April 1979 at 7:30 p.m.
Charlotte Civic Center
101 South College Street
Charlotte, N. C.

All comments should be received by 15 May 1979 to assure full consideration in the selection of various recommended plans of improvement. A late stage public meeting will be held later this year to present study recommendations. The date, time and place will be announced later.

STUDY AUTHORITY

Because of the almost yearly flooding experienced in the urban areas of the Sugar Creek Basin, particularly in the highly developed area of Charlotte, North Carolina, the committee on Public Works of the United States Senate, at the request of local interests made through their representatives in Congress, adopted a resolution requesting a study in the interest of flood control and allied purposes. The resolution adopted on 4 November 1971 is quoted as follows:

"RESOLVED BY THE COMMITTEE ON PUBLIC WORKS OF THE UNITED STATES SENATE, that the Board of Engineers for Rivers and Harbors, created under the Provisions of Section 3 of the Rivers and Harbors Act approved June 13, 1902, be, and is hereby, requested to review the report of the Chief of Engineers on the Santee River System, North Carolina and South Carolina, Published as Senate Document Number 189, Seventy-eighth Congress, and other Pertinent reports with a view to determining whether any modifications of the recommendations contained therein are advisable at this time, with particular reference to providing improvements in the Sugar Creek Basin, North Carolina and South Carolina, in the interest of flood control and allied purposes."

STUDY STATUS

The Sugar Creek Basin Study has progressed to the point of identifying existing and anticipated future flooding problems and formulating potential structural and nonstructural alternatives for the reduction of flood damages within the Sugar Creek Basin. All alternatives investigated to date for the western portion of the basin are discussed in this brochure. A similar brochure for the remainder of the basin is also available. Two public plan formulation meetings are being held on 18 and 19 April 1979. All plans formulated for the entire basin will be presented during these meetings and public input is solicited to assist in the selection of a recommended plan of improvement. A draft report of the study findings and recommendations is scheduled for completion in September of this year.

PLAN FORMULATION PROCESS

In order to formulate alternative plans of improvement, high damage areas were identified based on existing and projected future flood stages. Structural alternatives were formulated for each high damage reach. These alternatives consist of a variety of flood control measures including channel modifications, bridge alterations, paved channels, covered floodways, levees, floodwalls and reservoir storage. Nonstructural alternatives, which generally consist of the evacuation of flood plain structures from the flood plain, have also been formulated for all damage areas within the basin. Plans which emphasize

contributions to the improvement of environmental quality of the area and the National Economic Development will also be identified during the process of selecting a recommended plan of improvement. The general basin map (page 6) identifies the location and description of each structural alternative within the entire basin considered to date. A summary of each plan in the western portion of the basin (Area II) is subsequently discussed according to sub-basin location.

For purposes of clarity, sub-basins are discussed in a counter-clockwise manner beginning with Little Sugar Creek and proceeding through Taggart Creek. Structural alternatives are discussed first in each section followed by a brief discussion of potential nonstructural alternatives.

ECONOMICALLY JUSTIFIED

McMULLEN CREEK

③ — LEVEE PROTECTION

BRIAR CREEK

⑨ ⑩ — LEVEE PROTECTION

⑧ — CHANNEL MODIFICATION

BRIAR CREEK TRIB 2

②③ — CHANNEL MODIFICATION

LITTLE SUGAR CREEK

DERITA BRANCH

② ③ — CHANNEL MODIFICATION

④ — CHANNEL MODIFICATION

⑤ — COVERED FLOODWAY

⑥ — FLOOD CONTROL & CHANNEL MODIFICATION

SUGAR IRWIN & STEWART CREEKS

⑧ — FLOODWALL & LEVEE PROTECTION

ECONOMICALLY UNJUSTIFIED

McALPINE CREEK

① — CHANNEL MODIFICATION

② — LEVEE PROTECTION

McMULLEN CREEK

④ — LEVEE PROTECTION

McMULLEN TRIB

⑤ — CHANNEL MODIFICATION

LITTLE HOPE & TRIB

⑥ — CHANNEL MODIFICATION

⑦ — CHANNEL MODIFICATION

LITTLE SUGAR CREEK

⑪ — CHANNEL MODIFICATION

⑪ — FLOOD CONTROL RESERVOIR

IRWIN CREEK

⑪ — LEVEE PROTECTION

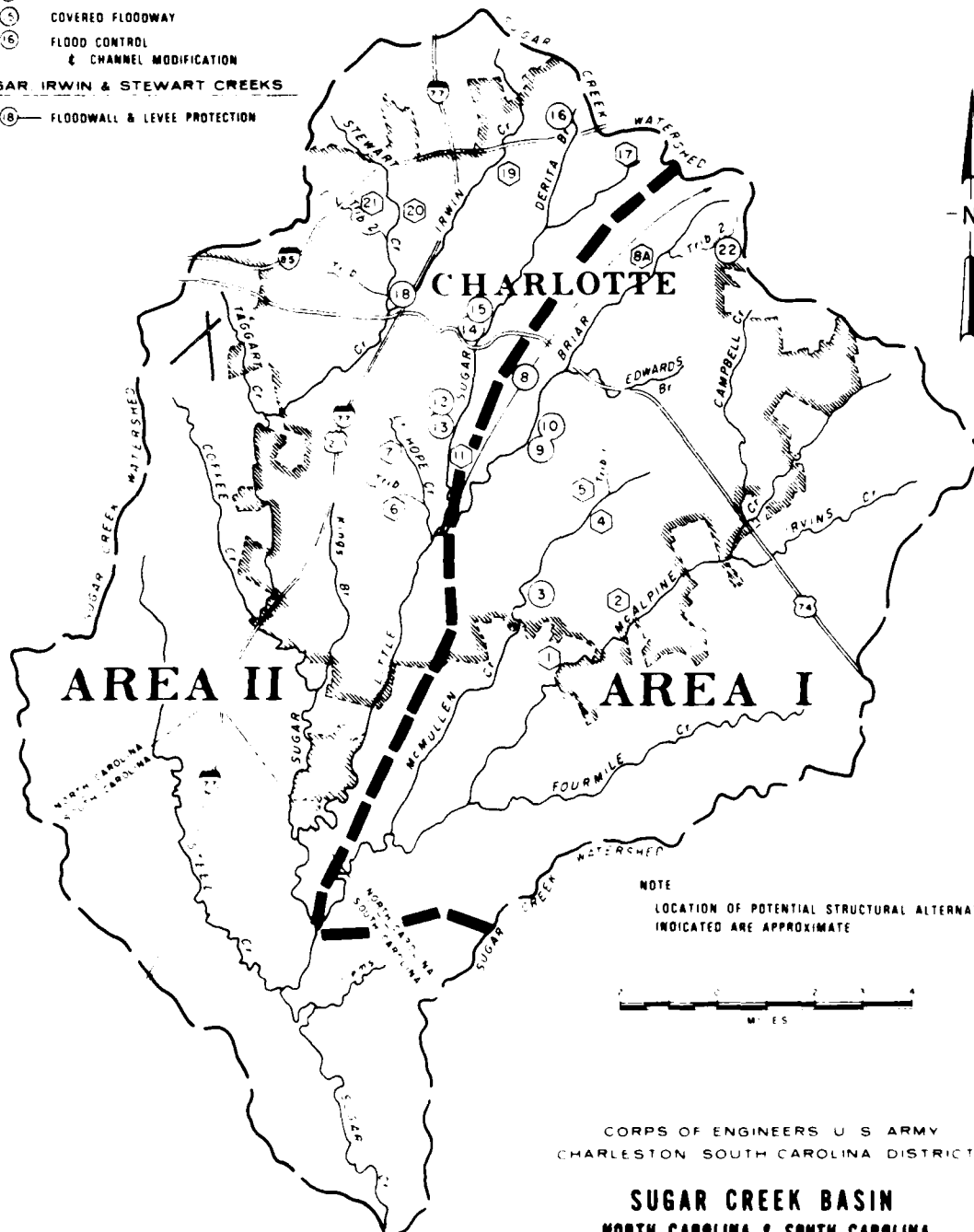
STEWART CREEK & TRIB

②③ — CHANNEL MODIFICATION

②③ — CHANNEL MODIFICATION

BRIAR CREEK

⑧A — CHANNEL MODIFICATION



NOTE

LOCATION OF POTENTIAL STRUCTURAL ALTERNATIVES INDICATED ARE APPROXIMATE

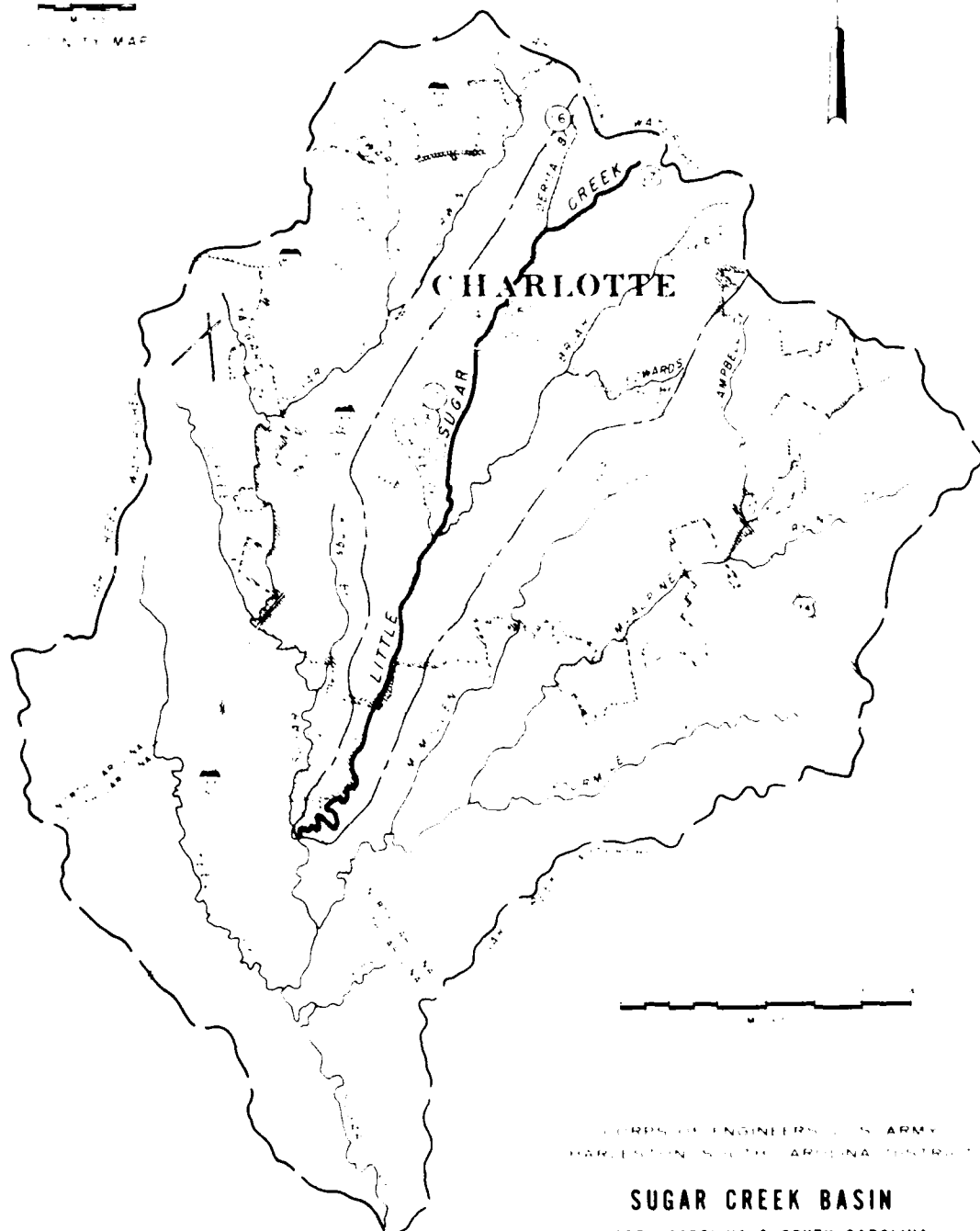
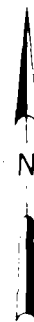
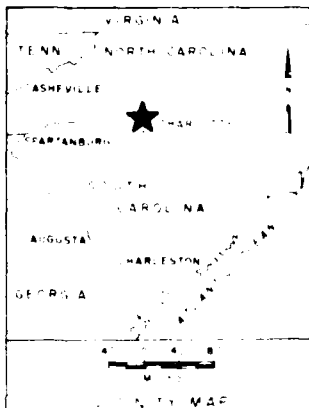


CORPS OF ENGINEERS U S ARMY
CHARLESTON SOUTH CAROLINA DISTRICT

SUGAR CREEK BASIN
NORTH CAROLINA & SOUTH CAROLINA
GENERAL MAP
STRUCTURAL ALTERNATIVES

**LITTLE SUGAR CREEK
&
DERITA BRANCH**

**LITTLE SUGAR CREEK
&
DERITA BRANCH**



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CHARLESTON, SOUTH CAROLINA DISTRICT

SUGAR CREEK BASIN
NORTH CAROLINA & SOUTH CAROLINA
LITTLE SUGAR & DERITA BRANCH
WATERSHEDS

STRUCTURAL ALTERNATIVES - LITTLE SUGAR CREEK

Alternative 11 - Channel Modification

Alternative 11 consists of channel modification to the lower reach of Little Sugar Creek located immediately upstream from the confluence with Briar Creek. The channel reach begins at Woodlawn Avenue and extends upstream to Princeton Avenue. Estimated first cost for improvements in this reach are \$1,131,000 which yields an average annual cost of \$30,650. Average annual benefits of \$76,800 when compared to annual cost yields a benefit-to-cost ratio of 0.95. Therefore, improvements in this reach do not appear to be economically justified.

Alternatives 12 & 13 - Channel Modification

Alternatives 12 & 13 were formulated to provide protection to the middle reach of Little Sugar Creek beginning in the vicinity of Princeton Avenue and extending approximately 7,900 feet upstream ending approximately 700 feet upstream from East Morehead Street. (See map, Alternatives 12 & 13). Preliminary design consists of a bottom width of 40 feet and channel side slopes of 2 horizontal to 1 vertical. Estimated channel excavation yardage for this reach is 84,100 cubic yards. Three bridge modifications are required as shown on the attached map.

Estimated first cost of this alternative is \$3,713,000 consisting of \$1,390,000 for channel construction; \$1,473,000 for lands, easements and rights-of-way; and \$850,000 for bridge modifications. Average annual cost of \$290,000 when compared to annual benefits of \$307,100 yields a benefit to cost ratio of 1.06.

Alternative 14 - Channel Modification/Paved Channel

Alternative 14 has been formulated to provide protection to that portion of Little Sugar Creek beginning at Independence Boulevard and ending approximately 600 feet upstream of East 4th Street. (See map, Alternative 14). This alternative consists of 1,400 feet of channel excavation and an additional 600 feet of paved channel in that reach upstream from East 4th Street. Design channel bottom width is 30.0 feet with side slopes of 2 horizontal to 1 vertical. The paved channel portion would consist of a rectangular shaped concrete lined channel with a 30-foot bottom width. Modification of the East 3rd and East 4th Street bridges would also be required.

Estimated first cost of this alternative is \$2,230,000 consisting of \$1,250,000 construction cost, \$280,000 for lands and \$700,000 for bridge modifications. Average annual cost of \$178,000 when compared to annual benefits of \$363,000 yields a benefit to cost ratio of 2.04.

Alternative 15 - Covered Floodway

Proposals for Alternative 15 consist of providing a covered floodway to alleviate flood damages in the vicinity of Central Piedmont Community College. The covered floodway would consist of 3 - 12 ft. x 14 ft. concrete box culverts beginning immediately downstream of East 3rd Street and continuing to the East 5th Street culvert. The recently constructed culvert beneath Kings Drive would become part of the covered floodway system. The lower portion would require removal of existing bridges at East 3rd and East 4th Streets. The bridges would be replaced by the culvert. Total length of the lower portion is 1,000 feet. An additional 530 feet of covered floodway would be required to connect the existing Kings Road culvert, and East 5th Street culvert. Protection from flooding by upstream conditions would be provided by the construction of a levee upstream to prevent overtopping of existing culverts.

Total estimated first cost of Alternative 15 is \$7,005,000 which yields an annual cost of \$575,000, including maintenance cost. Average annual benefits of \$656,900 when compared to annual cost yields a benefit to cost ratio of 1.14. (See Map, Alternative 15).

Alternative 16 - Reservoir Storage, Derita Branch/Channel Improvement, Little Sugar Creek

Proposals for Alternative 16 consist of providing a ponding area (Dry Reservoir) on Derita Branch to control flow from Derita Branch (a tributary of Little Sugar Creek) in combination with utilizing existing stream restrictions created by road embankments at the expressway crossing and North Tyron to control channel flow. Channel

enlargement and bridge modifications would be required to pass the controlled flows through damage reaches.

The flood retarding structure on Derita Branch would consist of a 36-foot high earth embankment (top width 20 feet) with a 125-foot concrete spillway. A 24-inch conduit would be placed at the bottom of the spillway to provide an uncontrolled outlet for the reservoir area. This outlet would pass normal flows but would retard flood flows. The structure would require approximately 45,500 cubic yards of earth fill and 5,000 yards of concrete. Total length of the structure is 1,100 feet.

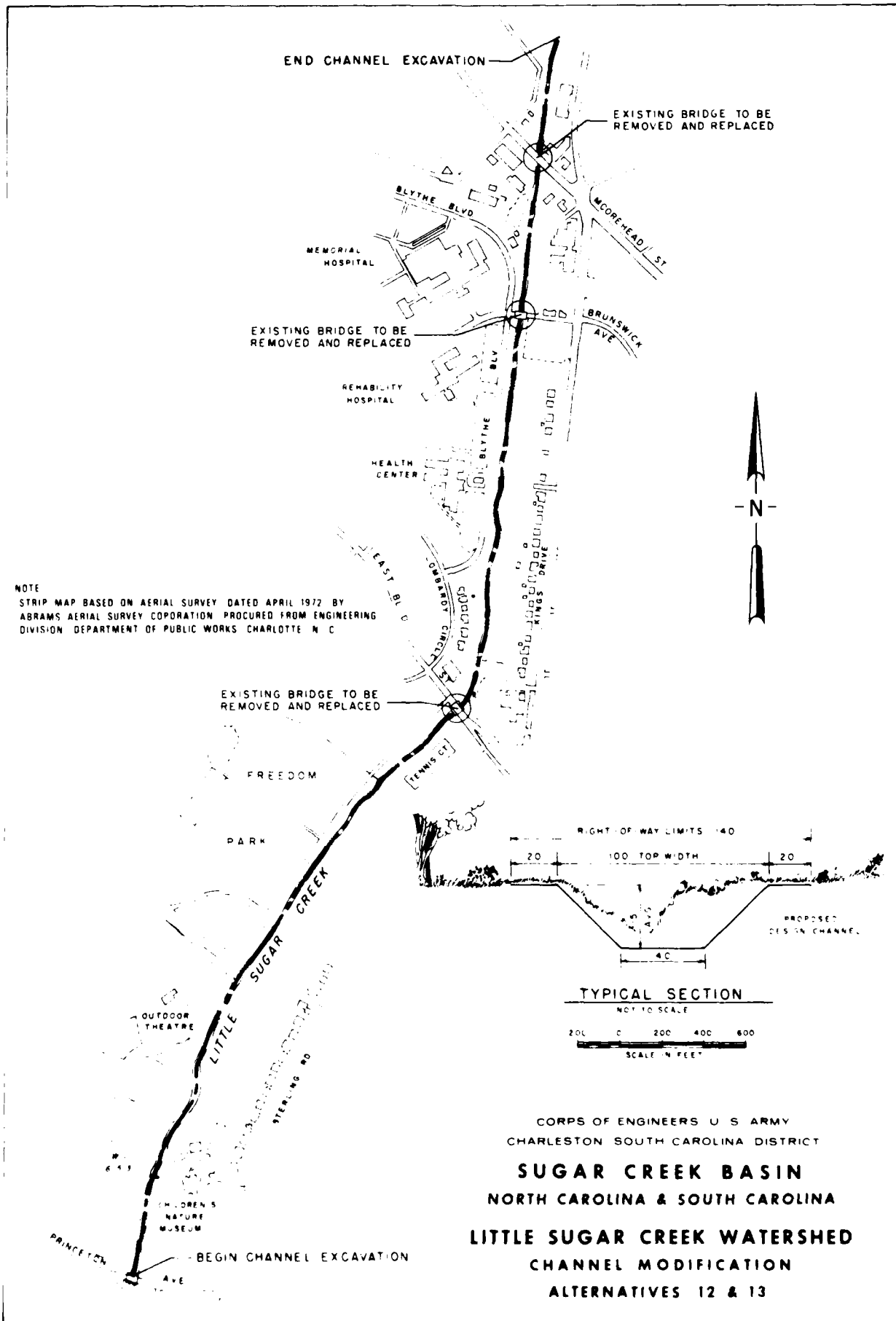
Approximately 2.0 miles of channel modification would also be required. This consists of channel enlargement to a bottom width of 30.0 feet with channel side slopes of 2 horizontal to 1 vertical. Modification of seven bridges would also be required as shown on the attached maps. (See maps, Alternative 16).

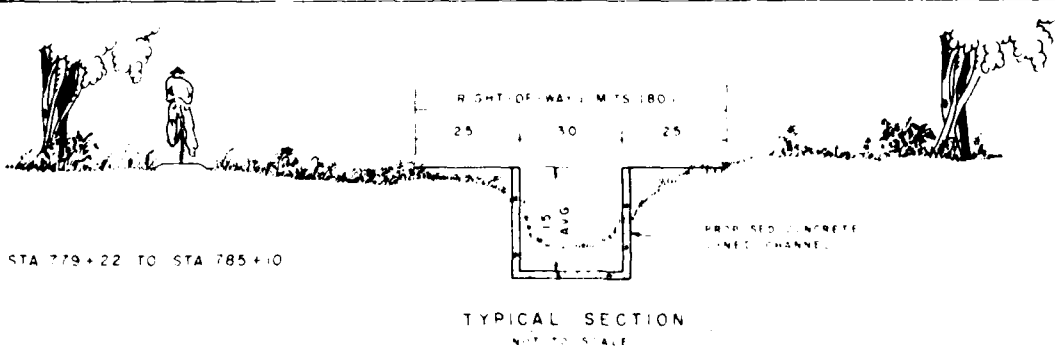
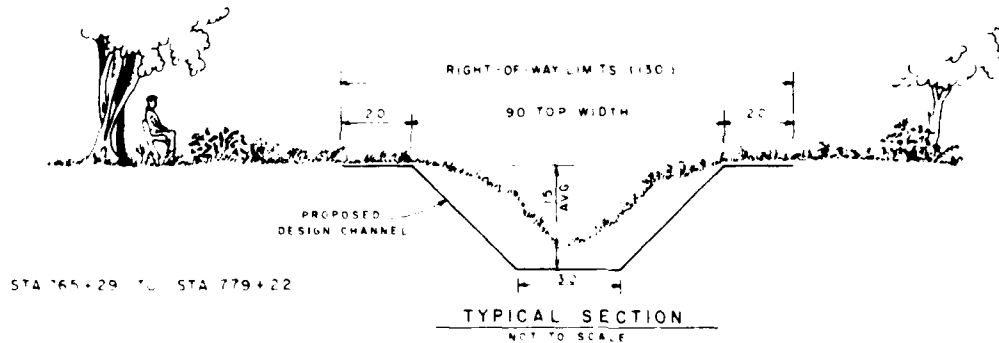
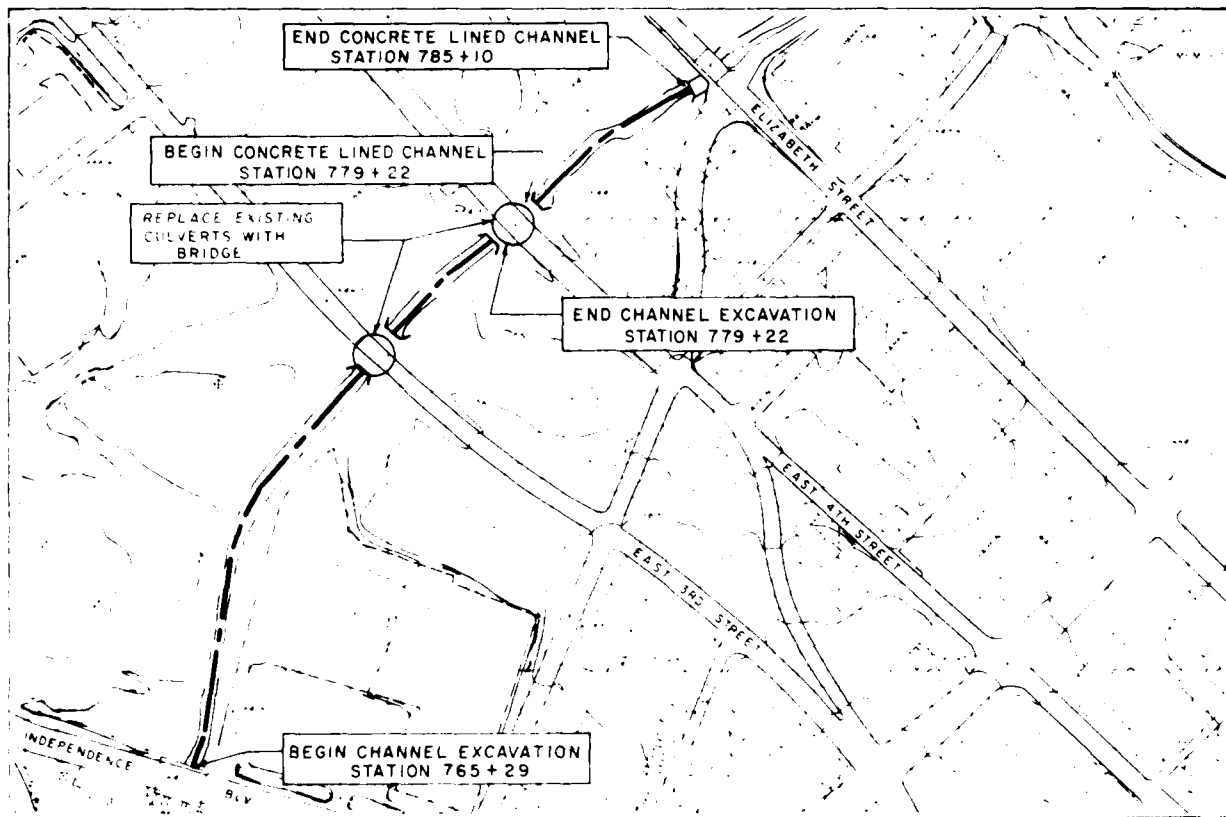
Estimated first cost of this alternative are \$9,262,000 which yields an annual cost of \$733,000 including operation and maintenance cost. Annual benefits of \$2,246,500 when compared to annual project cost yields a benefit to cost ratio of 3.06.

NOTE: Alternatives 12, 13, and 16 and either 14 or 15 may be constructed individually or in combination to provide a comprehensive plan of improvement for Little Sugar Creek. Each alternative discussed is incrementally justified.

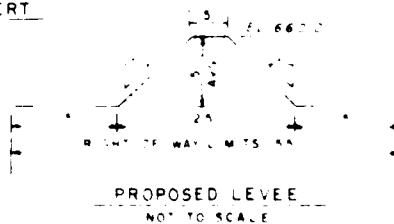
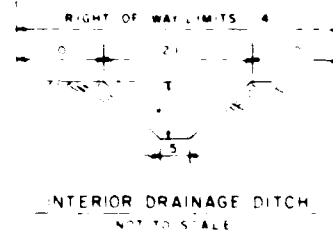
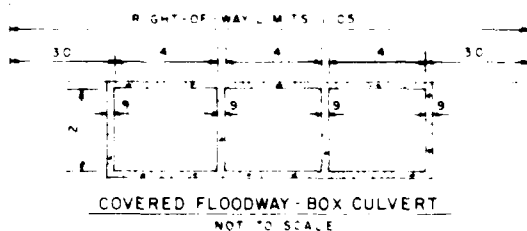
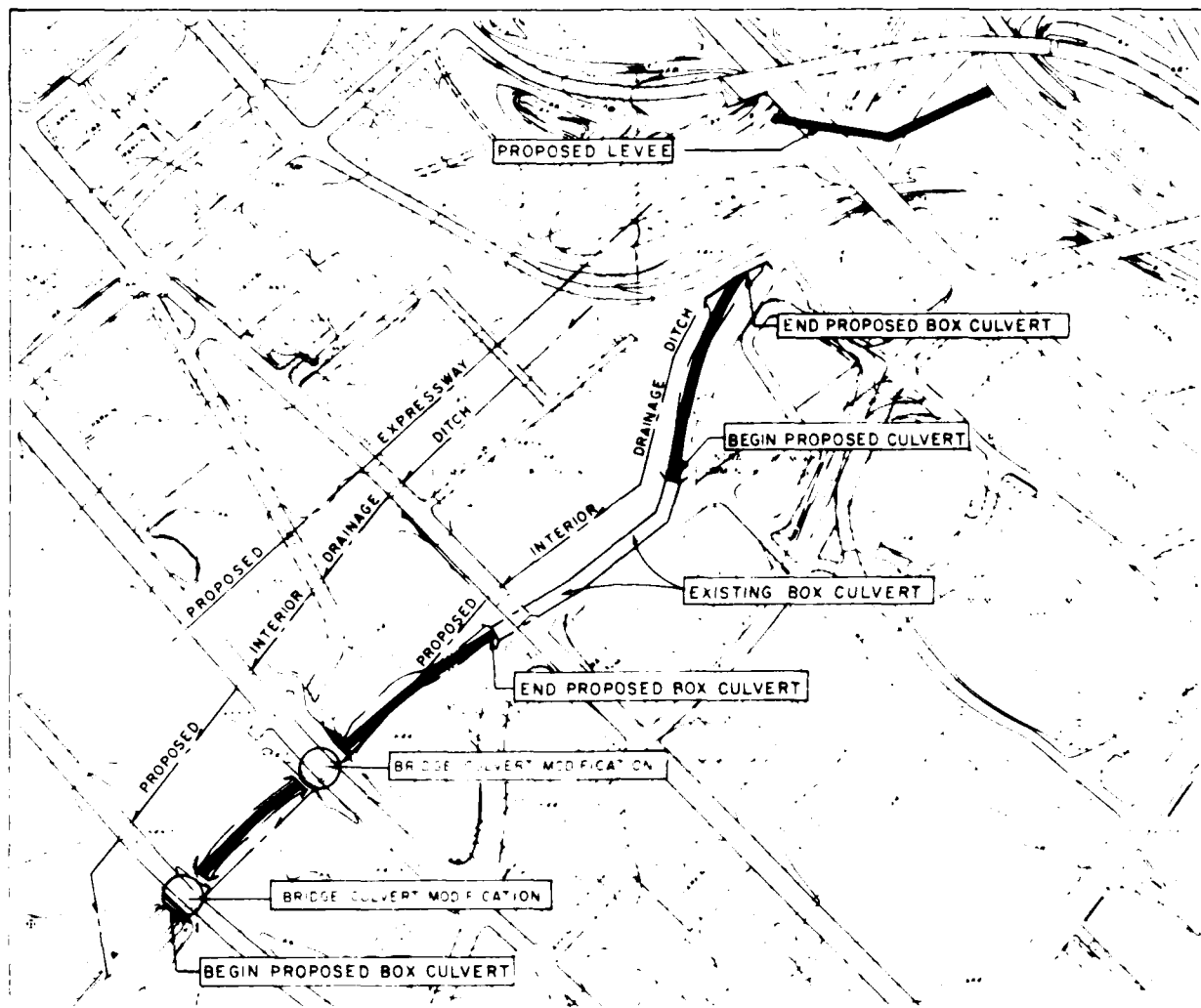
Alternative 17 - Reservoir Storage, Little Sugar Creek

Proposals for Alternative 17 are similar to those described for Alternative 16. The proposed dam site on Little Sugar Creek is located immediately upstream of N. Tyron Road, and would control approximately 2 square miles of drainage area. The reservoir site, however, has significant residential development which would result in high cost for purchasing lands and relocating occupants. Further investigation of this alternative has been terminated.

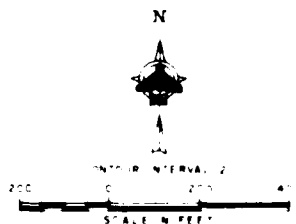




CORPS OF ENGINEERS U. S. ARMY
CHARLESTON SOUTH CAROLINA DISTRICT
SUGAR CREEK BASIN
NORTH CAROLINA & SOUTH CAROLINA
LITTLE SUGAR CREEK
CHANNEL MODIFICATION
ALTERNATIVE No. 14



NOTE ALIGNMENT OF PROPOSED INTERIOR DRAINAGE DITCHES AND EXPRESSWAY MAY VARY FROM ACTUAL LOCATION AS SHOWN ON MAP



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CHARLESTON SOUTH CAROLINA DISTRICT

SUGAR CREEK BASIN
NORTH CAROLINA & SOUTH CAROLINA

LITTLE SUGAR CREEK

COVERED FLOODWAY - CONCRETE BOX CULVERT
ALTERNATIVE No. 15

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SUGAR CREEK BASIN NORTH CAROLINA & SOUTH CAROLINA

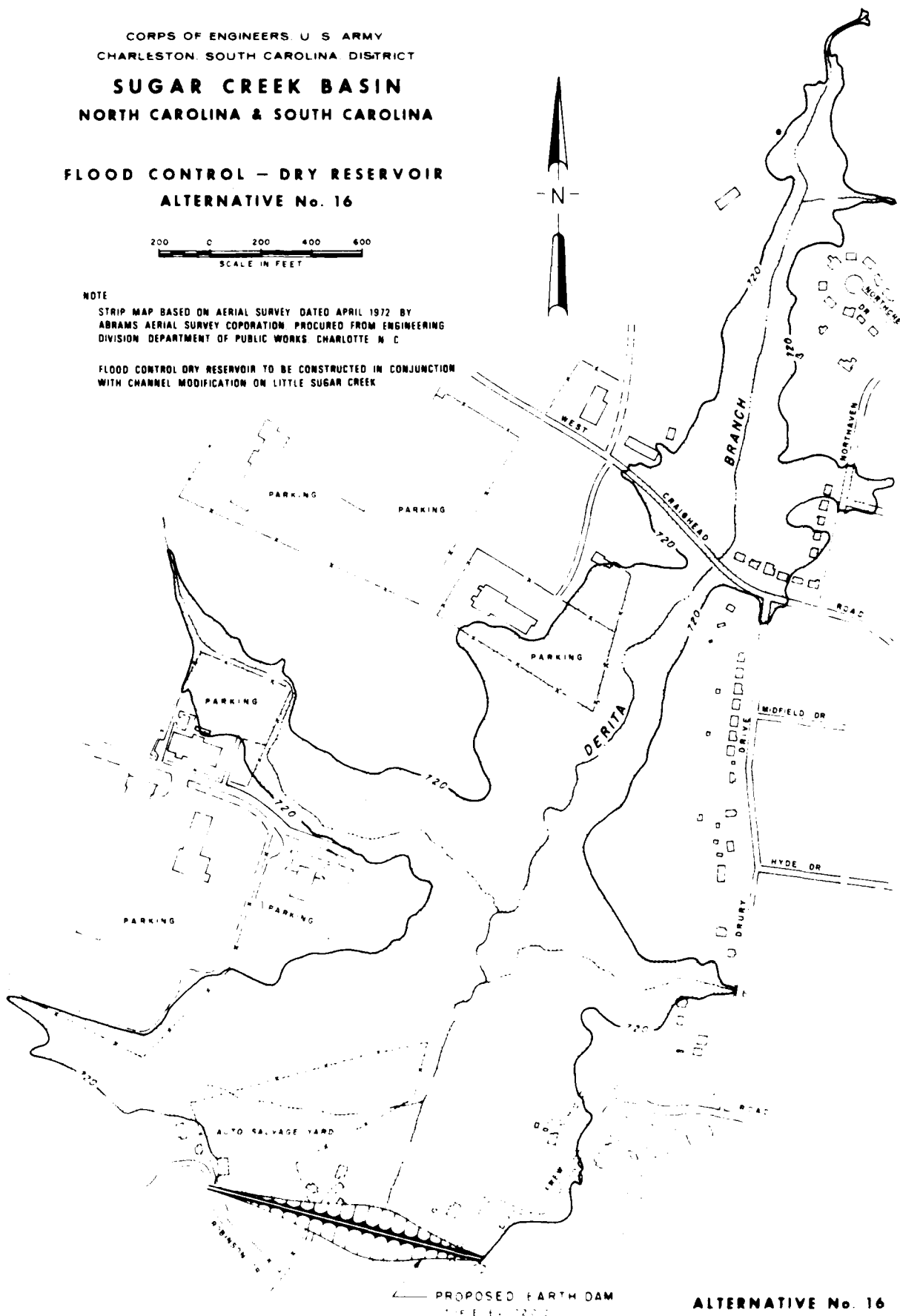
FLOOD CONTROL - DRY RESERVOIR ALTERNATIVE No. 16



NOTE

STRIP MAP BASED ON AERIAL SURVEY DATED APRIL 1972 BY
ABRAMS AERIAL SURVEY CORPORATION PROCURED FROM ENGINEERING
DIVISION DEPARTMENT OF PUBLIC WORKS CHARLOTTE N C

FLOOD CONTROL DRY RESERVOIR TO BE CONSTRUCTED IN CONJUNCTION
WITH CHANNEL MODIFICATION ON LITTLE SUGAR CREEK



PROPOSED EARTH DAM

ALTERNATIVE No. 16

SHEET 2 OF 2

NONSTRUCTURAL ALTERNATIVES - LITTLE SUGAR CREEK

Nonstructural measures for flood control generally modify flood damage susceptibility and do not reduce or eliminate flooding. Several such measures have already been implemented by the City of Charlotte including floodway zoning, flood insurance, and open space development of flood plain areas for recreational facilities. Other nonstructural measures being considered for Little Sugar Creek include the evacuation of damageable properties from the floodplain by either physically relocating floodplain structures or by demolishing affected structures. Reclaimed floodplain lands would then be restored to natural conditions or developed in a manner compatible with floodplain use such as parks, playgrounds, golf courses or environmental corridors.

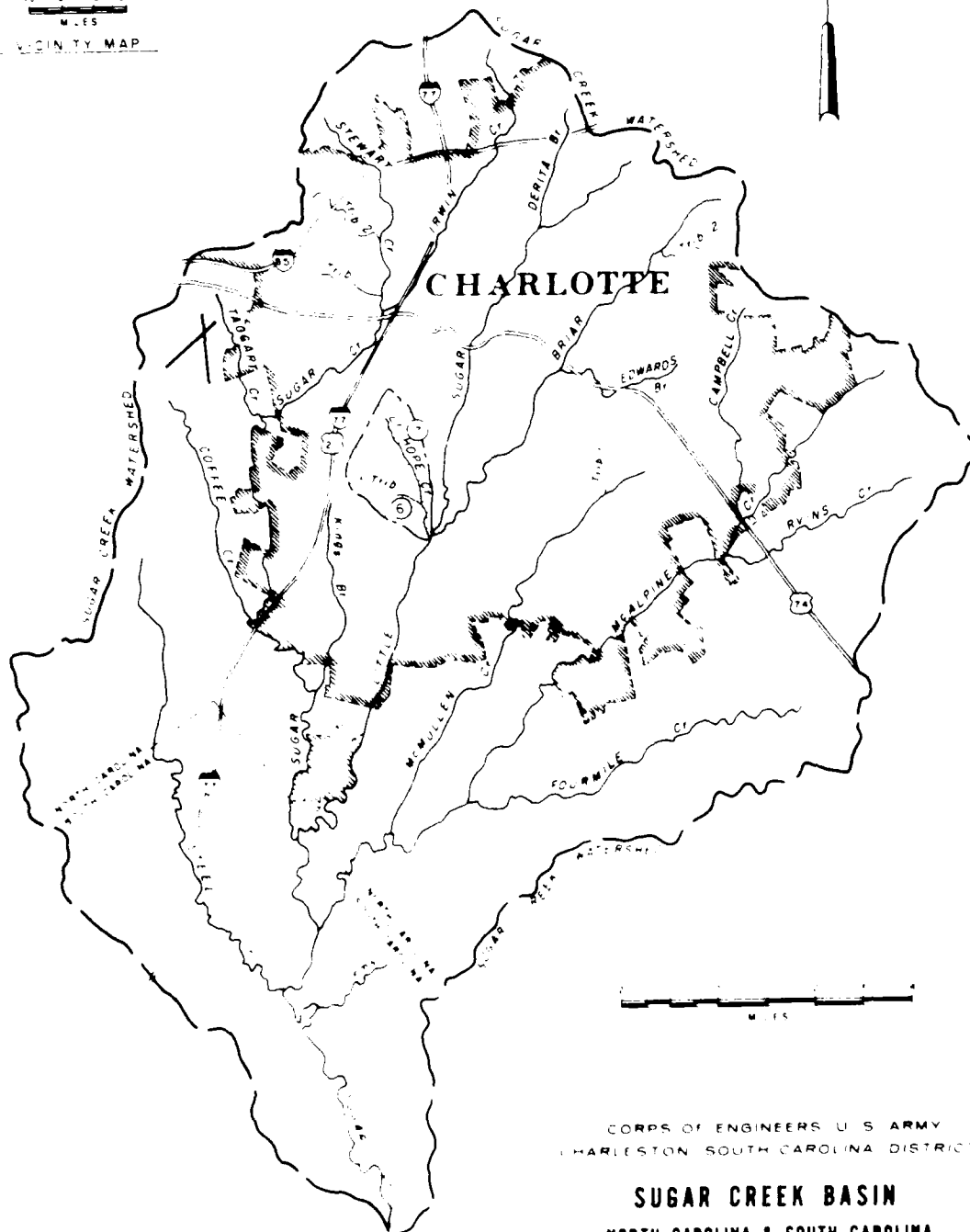
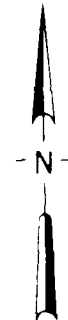
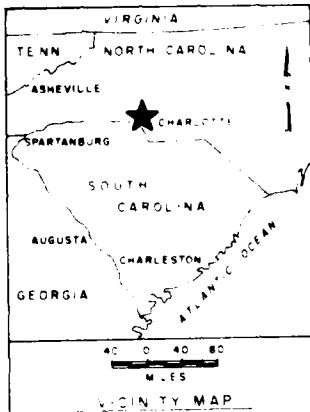
Alternatives being considered as part of this basin study include evacuation of structures from the 10-year, 15-year, and/or 100-year floodplain based on projected 2010 conditions. Economic analysis of nonstructural alternatives indicates a feasible alternative of evacuating all structures from the 100-year floodplain which consist of approximately 277 single-family residential structures; 234 apartment units and 102 commercial and/or public establishments. Incremental feasibility of the evacuation of floodplain structures from various damage areas of Little Sugar Creek will be discussed in workshop type groups during the course of this meeting.

NONSTRUCTURAL ALTERNATIVES - DERITA BRANCH

Economic analysis of nonstructural alternatives for Derita Branch indicates marginal feasibility of evacuating all floodplain structures from the

100-year floodplain which consists of 3 single-family residential structures and 5 commercial and/or public establishments. Incremental feasibility of the evacuation of floodplain structures from various damage areas of Derita Branch will also be discussed in workshop type groups during the course of this meeting.

LITTLE HOPE CREEK & TRIBUTARY



CORPS OF ENGINEERS U S ARMY
CHARLESTON SOUTH CAROLINA DISTRICT

SUGAR CREEK BASIN
NORTH CAROLINA & SOUTH CAROLINA
LITTLE HOPE WATERSHED

STRUCTURAL ALTERNATIVES - LITTLE HOPE CREEK/LITTLE HOPE TRIBUTARY

Alternatives 6 & 7. Channel Modification

Proposed modifications for Little Hope Creek and Little Hope Tributary are discussed together since improvements on one creek are contingent upon improvements on the other. Preliminary design is based on confining the 10-year flow in bank. Channel modifications would begin on Little Hope Creek approximately 800 feet downstream from Seneca Place Road and extend upstream to Woodlawn Drive. Improvements on Little Hope Tributary would begin at the confluence with Little Hope Creek and extend 1,900 feet upstream to the vicinity of Bradbury Drive. Total length of channel modification would be approximately 6,000 feet, channel bottom widths would vary from 20 feet to 10 feet with side slopes of 2 horizontal to 1 vertical. Bridge modifications would be required at the following locations: Seneca Place; Mockingbird Lane; Montford Road; and Bradbury Drive.

Estimated first cost of this alternative is \$1,071,000 which yields an annual cost of \$92,000 including annual maintenance cost. Annual benefits of \$44,150 when compared to annual cost yield a benefit to cost ratio of 0.47. Further investigation of this alternative has been terminated due to the lack of economic justification.

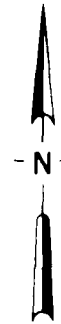
NONSTRUCTURAL ALTERNATIVE - LITTLE HOPE CREEK

Nonstructural measures for flood control generally modify flood damage susceptibility and do not reduce or eliminate flooding. Several such measures have already been implemented by the City of Charlotte including floodway zoning, flood insurance, and open space development of floodplain areas for recreational facilities. Other nonstructural measures being considered for Little Hope Creek include the evacuation of damageable properties from the floodplain by either physically relocating floodplain structures or by demolishing affected structures. Reclaimed floodplain would then be restored to natural conditions or developed in a manner compatible with floodplain use such as parks, playgrounds, golf courses or environmental corridors.

Alternatives being considered as part of this basin study include evacuation of structures from the 10-year, 15-year, and/or 100-year floodplains based on projected 2010 conditions. Economic analysis of nonstructural alternatives indicate that evacuation of floodplain structures on Little Hope Creek is economically unjustified.

NONSTRUCTURAL ALTERNATIVES - LITTLE HOPE TRIBUTARY

Approximately 30 single-family residential structures are located within the 100 year floodplain of Little Hope Tributary. However, as in the case with Little Hope Creek, evacuation of structures from the floodplain of Little Hope Tributary is economically unjustified.



SUGAR CREEK BASIN
NORTH CAROLINA & SOUTH CAROLINA
KINGS BRANCH WATERSHED

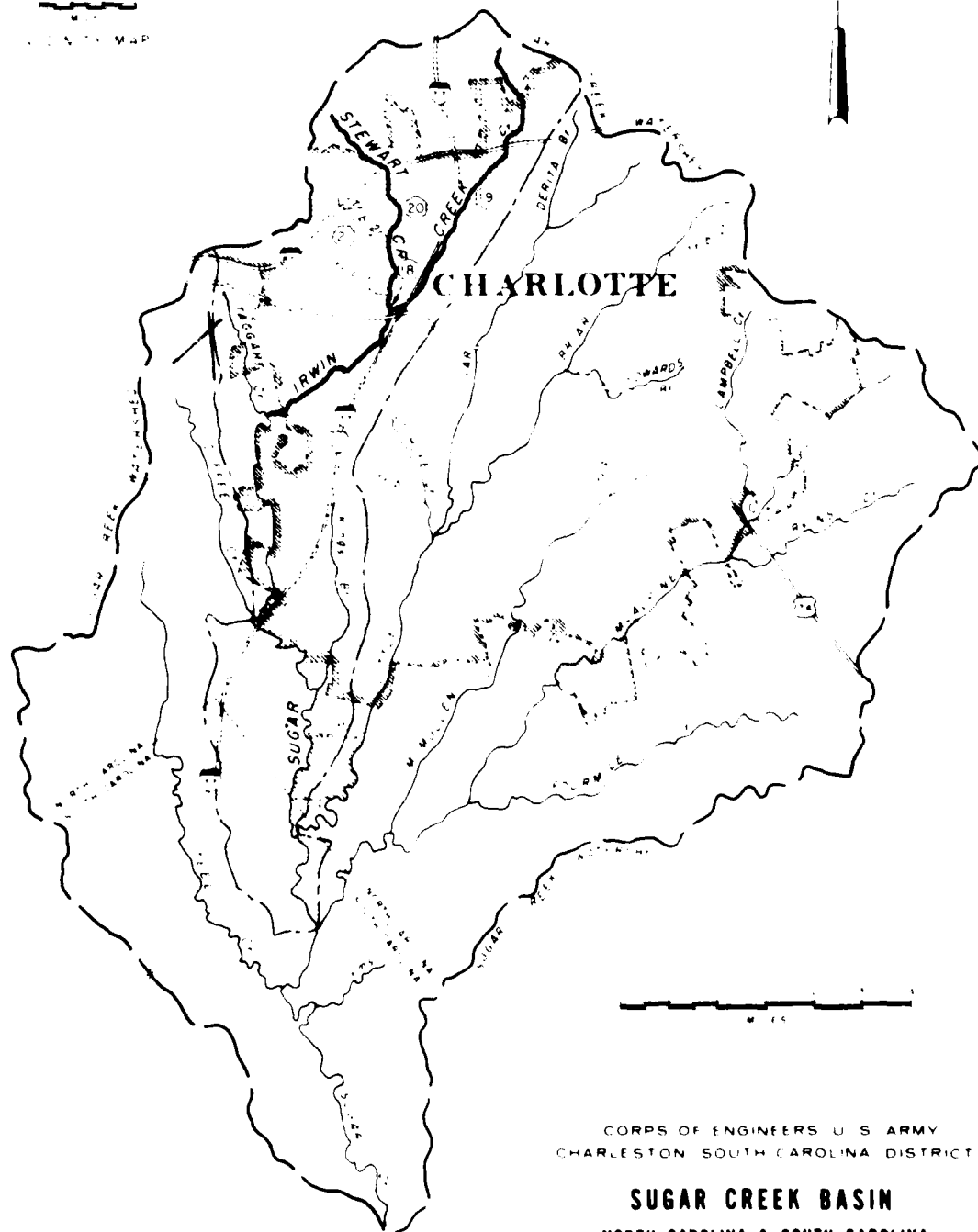
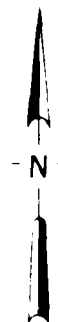
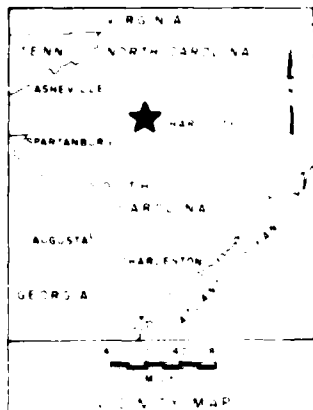
STRUCTURAL ALTERNATIVE - KINGS BRANCH

Due to the relatively low average annual damages experienced on Kings Branch, structural alternatives for flood control were deemed unjustified. Nonstructural alternatives, however, were formulated as a method of alleviating flood damages which may be expected to occur. Potential nonstructural solutions are discussed in the following paragraphs:

NONSTRUCTURAL ALTERNATIVES - KINGS BRANCH

Nonstructural measures for flood control generally modify flood damage susceptibility and do not reduce or eliminate flooding. Several such measures have already been implemented by the City of Charlotte including floodway zoning, flood insurance, and open space development of floodplain areas for recreational facilities. Other nonstructural measures being considered for Kings Branch include the evacuation of damageable properties from the floodplain by either physically relocating floodplain structures or by demolishing affected structures. Reclaimed floodplain lands would then be restored to natural conditions or developed in a manner compatible with floodplain use such as parks, playgrounds, golf courses or environmental corridors.

Alternatives being considered as part of this basin study include evacuation of structures from the 10-year, 15-year, and/or 100-year floodplains based on projected 2010 conditions. Economic analysis of nonstructural alternatives, however, indicates that removal of the 75 apartment units located within the 100-year floodplain of Kings Branch is economically unjustified.



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SUGAR CREEK BASIN
NORTH CAROLINA & SOUTH CAROLINA
SUGAR-IRWIN & STEWART CREEK
WATERSHED

SUGAR-IRWIN & STEWART CREEKS

STRUCTURAL ALTERNATIVES - STEWART - IRWIN CREEKS

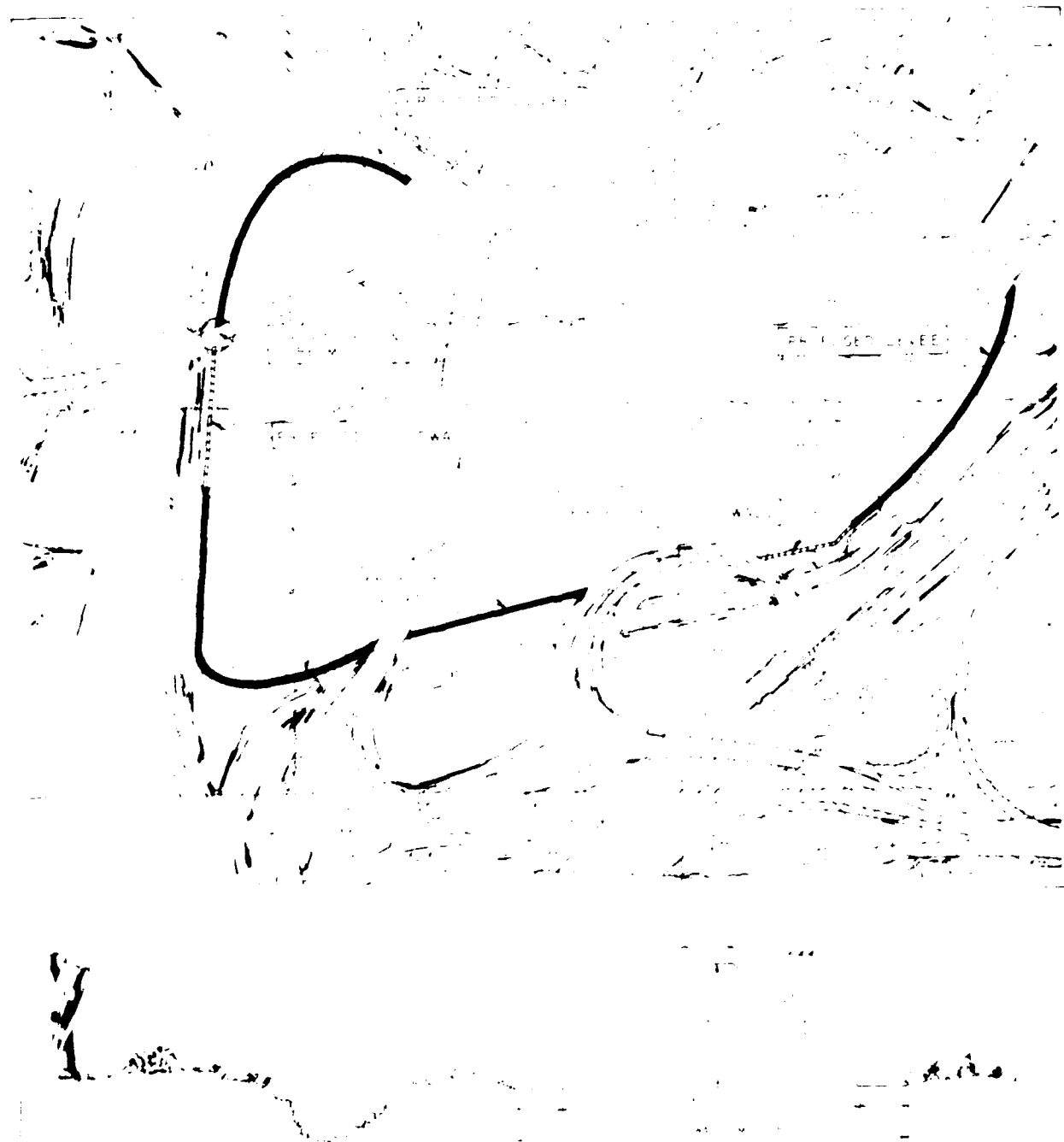
Alternative 18 - Floodwall/Levee System

A floodwall-levee system has been formulated as Alternative 18 to provide flood protection to commercial establishments located in the flood plain at the confluence of Stewart and Irwin Creeks. (See map, Alternative 18). Preliminary design of the levee/floodwall system assumes a top elevation of 644.0 feet m.s.l. Total length of the system is 3,900 feet. Three hundred and fifty feet of floodwall would be required in the vicinity of Becker Place Road and an additional 300 feet would be required to protect structures located immediately upstream from the Interstate exit ramp. Total length of floodwall is 650 feet. Approximately 550 feet of existing road fills (I-77 exit ramp and Walnut Street could be utilized to form a portion of the levee). The remaining 2,700 feet of the system would require construction of an earth embankment. Average height of the earth embankment is 12.5 feet. Modification of one road crossing (West Morehead Street) would be required.

Estimated first cost of this alternative is \$1,560,000 consisting of \$760,000 construction cost; \$550,000 for lands, easements and rights-of-way; and \$250,000 for roadway modifications. Average annual cost of \$111,250 when compared to annual benefits of \$149,700 yields a benefit to cost ratio of 1.34.

Alternative 19 - Floodwall Protection

Proposals for Alternative 19 consist of constructing a 1,000-foot long, 12-foot high floodwall to provide protection to 22 rental properties located in the vicinity of Andriell Terrace. Estimated first cost of this alternative is \$703,800. Annual cost of \$50,200 when compared to annual benefits of \$97,700 yields a benefit to cost ratio of 1.94. It should be noted, however, that affected properties could be purchased and demolished for less cost than providing floodwall protection. For this reason, the non-structural alternative of evacuating the structures from the flood plain may prove to be the better alternative.



SUGAR CREEK BASIN
NORTH CAROLINA & SOUTH CAROLINA
SUGAR IRWIN & STEWART CREEK
WATERSHEDS
FLOODWALL & LEVEE PROTECTION
ALTERNATIVE No. 18

STRUCTURAL ALTERNATIVES - STEWART CREEK

Alternative 20 - Channel Modification

Proposed modifications for Stewart Creek consist of channel enlargement beginning in the vicinity of Tuckaseegee Road and extending 7,000 feet upstream to a point approximately 900 feet above West Trade Street. The channel was designed to carry the 10-year flow in bank. A bottom width of 20 feet and channel side slopes of 2 horizontal to 1 vertical were used for preliminary design purposes. Five road modifications would be required. Total channel excavation volume is estimated to be 27,800 cubic yards.

Estimated first cost of channel modifications for Stewart Creek are \$1,758,000 consisting of \$522,000 for construction, \$466,000 for lands, easements and rights-of-way, and \$770,000 for bridge modifications. Annual cost of \$147,000 when compared to annual benefits of \$121,600 yields a benefit to cost ratio of 0.82.

Alternative 21 - Channel Modification, Stewart Tributary 2

Channel modifications for Stewart Tributary 2 were originally formulated in conjunction with improvements on Stewart Creek. However, further evaluation indicated that improvements on Tributary 2 would not be required if Alternative 20 were implemented. Therefore, no further structural evaluation of Tributary 2 is planned.

NONSTRUCTURAL ALTERNATIVES - SUGAR-IRWIN CREEKS

Nonstructural measures for flood control generally modify flood damage susceptibility and do not reduce or eliminate flooding. Several such measures have already been implemented by the City of Charlotte including floodway zoning, flood insurance, and open space development of floodplain areas for recreational facilities. Other nonstructural measures being considered for Sugar-Irwin Creeks include the evacuation of damageable properties from the floodplain by either physically relocating floodplain structures or by demolishing affected structures. Reclaimed floodplain lands would then be restored to natural conditions or developed in a manner compatible with floodplain use such as parks, playgrounds, golf courses or environmental corridors.

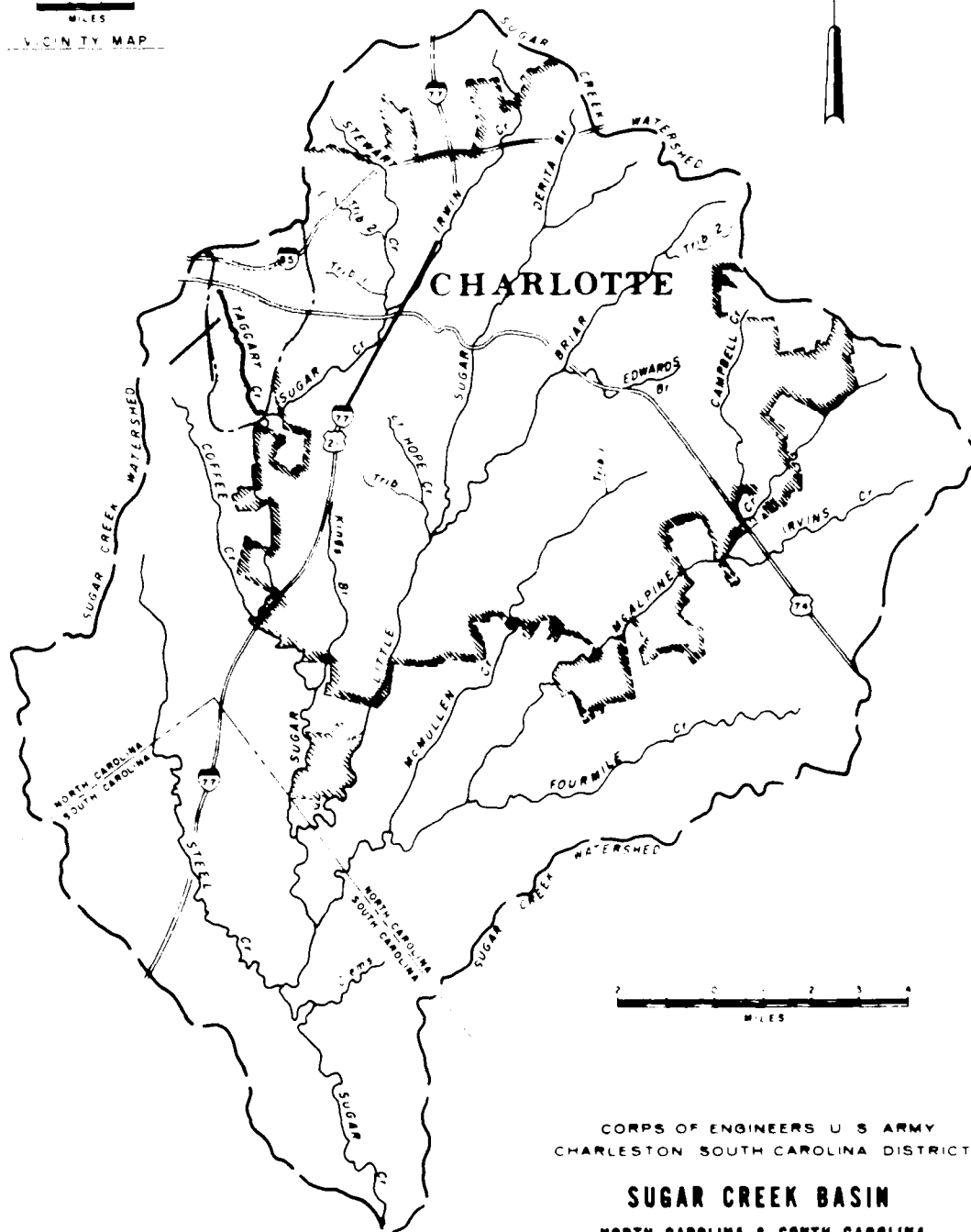
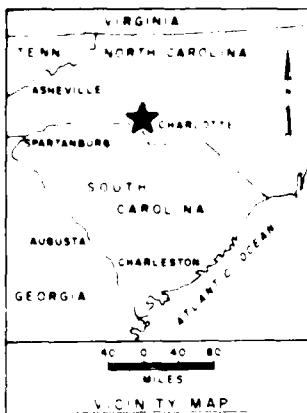
Alternatives being considered as part of this basin study include evacuation of structures from the 10-year, 15-year, and/or 100-year floodplain based on projected 2010 conditions. Economic analysis of nonstructural alternatives indicates a marginally feasible alternative of evacuating all structures for the 10 and 15-year floodplains which include 103 single-family residential structures and 22 commercial and/or public establishments. Evacuation of the 100-year floodplain is not economically justified. Incremental feasibility of the evacuation of floodplain structures from various damage areas of Sugar-Irwin Creeks will be discussed in workshop type groups during the course of this meeting.

NONSTRUCTURAL ALTERNATIVES - STEWART CREEK

Economic analysis of nonstructural alternatives for Stewart Creek indicates that removal of floodplain structures from the entire reach of Stewart Creek is economically unjustified. However, removal of floodplain structures from isolated damage areas within the Stewart Creek floodplain may be feasible. Incremental feasibility of the evacuation of floodplain structures from various damage areas of Stewart Creek will be discussed in workshop type groups during the course of this meeting.

NONSTRUCTURAL ALTERNATIVES - STEWART TRIBUTARIES 1 and 2

Investigations of nonstructural alternatives for the tributaries to Stewart Creek also indicate that the removal of all floodplain structures is not economically justified. However, removal of floodplain structures from isolated damage areas within the respective floodplains of Stewart Tributaries 1 & 2 may be feasible. Incremental feasibility of the evacuation of structures from various reaches of Stewart Tributaries 1 and 2 will be discussed in workshop type groups during the course of this meeting.



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SUGAR CREEK BASIN
NORTH CAROLINA & SOUTH CAROLINA
TAGGART CREEK WATERSHED

STRUCTURAL ALTERNATIVES - TAGGART CREEK

Due to the relatively low average annual damages experienced on Taggart Creek, structural alternatives for flood control were deemed unjustified. Nonstructural alternatives, however, were formulated as a method of alleviating flood damages which may be expected to occur. Potential nonstructural solutions are discussed in the following paragraphs:

NONSTRUCTURAL ALTERNATIVES - TAGGART CREEK

Nonstructural measures for flood control generally modify flood damage susceptibility and do not reduce or eliminate flooding. Several such measures have already been implemented by the City of Charlotte including floodway zoning, flood insurance, and open space development of floodplain areas for recreational facilities. Other nonstructural measures being considered for Taggart Creek include the evacuation of damageable properties from the floodplain by either physically relocating floodplain structures or by demolishing affected structures. Reclaimed floodplain lands would then be restored to natural conditions or developed in a manner compatible with floodplain use such as parks, playgrounds, golf courses or environmental corridors.

Alternatives being considered as part of this basin study include evacuation of structures from the 10-year, 15-year, and/or 100-year floodplains based on projected 2010 conditions. Economic analysis of nonstructural alternatives, however, indicate that removal of structures from the floodplain of Taggart Creek is economically unjustified.

STRUCTURAL ALTERNATIVES - PINEVILLE, NORTH CAROLINA

The City of Pineville, North Carolina is located south of Charlotte at the confluence of Little Sugar and Sugar Creeks. Mecklinburg County has constructed a dike with flapgated culverts for interior drainage to provide protection to residential and commercial structures located within floodplain areas. Hydrologic analysis of the dike indicates that the dike has sufficient height to provide protection in excess of the 50-year frequency flood. Additional structural improvements by the Federal government are not economically justified due to the relatively low amount of remaining annual damages.

NONSTRUCTURAL ALTERNATIVES - PINEVILLE, NORTH CAROLINA

Nonstructural alternatives considered during this basin investigation for the Pineville area include the evacuation of damageable properties from the floodplain by either physically relocating floodplain structures or by demolishing affected structures. Reclaimed floodplain lands would then be restored to natural conditions or developed in a manner compatible with floodplain use such as parks, playgrounds, golf courses or environmental corridors. Economic analysis of nonstructural alternatives, however, indicates that removal of floodplain structures in the Pineville area is not economically justified.

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